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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/581,633

06/02/2006

Takayuki Shima

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EXAMINER

VERDERAME, ANNA L

ART UNIT

PAPER NUMBER

1795

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/581,633	<b>Applicant(s)</b> SHIMA ET AL.	
	<b>Examiner</b> ANNA L. VERDERAME	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06/02/2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 3,4,6,8,10 and 12-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3,4,6,8,10 and 12-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06/02/2006 and 07/09/2008</u> .                               | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

This correspondence is in response to the application filed on 06/02/2006. There are three sets of claims filed on this date. The examiner has decided to examine the claims which are properly amended (added portions are underlined and deleted portions are crossed out).

#### ***Claim Rejections - 35 USC § 112***

1. Claims 14-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 14-16 are directed to an optical recording disc but depend from claim 13 drawn to a method for manufacturing an optical recording disc.

#### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-12 are rejected under 35 U.S.C. 102(b) as being anticipated by J. Kim, I. Wang, D. Yoon, I. Park, and D. Shin. Applied Physics Letters. 83 , 1701 (2003).

Kim et al. teaches an optical recording medium comprising a substrate of polycarbonate, a ZnS-SiO<sub>2</sub> layer, an Ag<sub>6</sub>In<sub>4.5</sub> Sb<sub>60.8</sub> Te<sub>28.7</sub> layer, a ZnS-SiO<sub>2</sub> layer, a PtO<sub>x</sub> layer, a ZnS-SiO<sub>2</sub>, an Ag<sub>6</sub>In<sub>4.5</sub> Sb<sub>60.8</sub> Te<sub>28.7</sub> layer and a ZnS-SiO<sub>2</sub> layer (figure 1). The ZnS-SiO<sub>2</sub> layer is (ZnS)<sub>85</sub>(SiO<sub>2</sub>)<sub>15</sub> like the applicant's. Each

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layer is formed by sputtering. The  $\text{PtO}_x$  layer is formed using a  $\text{Pt}_{100}$  target (page 1, column 1). The  $\text{PtO}_x$  layer is  $\text{PtO}_{1.1}$  (second page, column 1). The medium is recorded using a laser beam. Upon exposure the  $\text{PtO}_x$  layer decomposes resulting in a release of oxygen gas and the generation of Pt nanoparticles (page 2, first column). Release of gas and the subsequent volume change causes a deformation of the two upper and lower  $\text{Ag}_6\text{In}_{4.5}\text{Sb}_{60.8}\text{Te}_{28.7}$  (page 2, column 2).

4. Claims 1-12 are rejected under 35 U.S.C. 102(b) as being anticipated by T. Kikukawa, T. Nakano, T. Shima., and J. Tominaga. Applied Physics Letters. 81, 4697 (2002).

Nakano et al. teaches an optical recording medium comprising a  $\text{ZnS-SiO}_2$  layer, a  $\text{PtO}_2$  layer,  $\text{ZnS-SiO}_2$  layer, an  $\text{AgInSbTe}$  layer and a  $\text{ZnS-SiO}_2$  sputtered onto a substrate (page 1, column 1). The  $\text{PtO}_2$  layer was formed using a Pt target. The gas-mass flow ratio of  $\text{O}_2$  to the total was 0.20 (page 1 column 2). When the  $\text{PtO}_2$  layer is radiated the layer undergoes a decomposition reaction wherein oxygen gas is released and Pt particles precipitate (page 2). Bubble pits are formed due to the oxygen gas released (figures 2 and 4).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over either of Kim et al. or Nakano et al. as applied above and further in view of Haratani et al. 5,401,609 and Salama. RF Sputtered Aluminum Oxide Films on Silicon. Toronto University Department of Electrical Engineering(1970).

Neither Kim nor Nakano teaches power density or film formation rates. Nakano teaches a gas-mass ratio of oxygen of 20%. Haratani et al. teaches a recording layer comprising Ag, M, and O(abstract). During recording the recording layer undergoes a decomposition reaction and releases gas which generates a void 31(8/23-35). In example 1 an Ag Ni O film is formed by sputtering. The sputtering was carried out at a pressure of  $5.5 \times 10^{-1}$  Pa. Oxygen and Argon flow rates were the same. A sputtering power of 200 W(9/55-10/4).

Haratani et al. teaches a sputtering power. The examiner notes that power density is relationship between the sputtering power and the dimensions of the sputtering target.

Salama teaches the formation of an aluminum oxide film from an alumina target. Power density for the film formation is in the range of 0.5 to 3 W/cm<sup>2</sup> and the deposition rate is in the range from 20 to 80 angstroms/min.

It would have been obvious to form the PtO<sub>x</sub> film of either Kim et al. or Nakano et al. using a sputtering process in which the flow rates of oxygen and argon were the same and in which the pressure is .55Pa based on the disclosure of Haratani et al. and with the reasonable expectation of success. Further it

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would have been obvious to have the power density for the sputtering process be in the range of from 0.5 to 3 W /cm<sup>2</sup> and to have the film formation rate be in the range of 20 to 80 angstroms/min based on the disclosure by Salama to use these power densities and film formation rates when forming oxide films.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

-US 2004/0247891- teaches an optical recording medium comprising a substrate a first dielectric layer an alloy layer and a second dielectric layer (figure 1). The alloy layer 30 can be replaced with a PtO<sub>x</sub> layer, an AgO<sub>x</sub> layer a PdO<sub>x</sub> layer or a WO<sub>x</sub> layer (0045). When the metal oxide layer is heated the layer decomposes into a metal and releases oxygen. The release of gas causes an expansion which forms a pit

JP-09-296266- A thin film is formed using a power density of <1W/cm<sup>2</sup>. The benefit of doing this is that less electric power is consumed.

-Yi Chiu et al., "Fabrication and nonlinear optical properties of nanoparticle silver oxide films", Journal of Applied Physics, vol. 94, no. 3, 1 August 2003, pages 1996-2001, XP002479469- The examiner notes that the sputtering powers used by the applicant are lower than those used in the references cited by the examiner. However, Yi Chiu et al. discussed the use of lower sputtering powers to avoid agglomeration in the results section on page 2. Sputtering powers of less than 50 W are recommended for sputtering AgO<sub>x</sub> films.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANNA L. VERDERAME whose telephone number is (571)272-6420. The examiner can normally be reached on M-F 8A-4:30P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571)272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark F. Huff/  
Supervisory Patent Examiner, Art Unit 1795

/A. L. V./  
Examiner, Art Unit 1795